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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/683,088	11/16/2001	Jack O. Chu	BUR920000077	8055

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EXAMINER

SONG, MATTHEW J

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 07/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/683,088

Applicant(s)

CHU ET AL.

Examiner

Matthew J Song

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 13-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2. 6) ☐ Other:

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DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-12, drawn to an apparatus, classified in class 117, subclass 200.
- II. Claims 13-20, drawn to a method, classified in class 117, subclass 84.

2. The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus as claimed can be used to practice another and materially different process, such as one where the supply of the first treating gas is not stopped.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Anthony Kanale on 12/10/2002 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-12. Affirmation of this election must be made by applicant in replying to this Office action. Claims 13-20 are

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withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-4 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Akbar et al (US 5,259,918).

Akbar et al discloses a quartz reaction chamber **102** and a furnace **104** surrounds the reaction chamber. Akbar et al also discloses a first source **144** for supplying gas to the reaction chamber, a first pumping system comprising a turbomolecular pump **108** and a rotary pump **110** and a second source **148** for supplying a second gas to the reaction chamber. Akbar et al also discloses a second pumping system comprising a turbo molecular pump **118** and a rotary pump **120** and a third pumping system comprising a turbomolecular pump **160**, a roots blower **162**, and a rotary pump **164** (col 5, ln 10-67 and Fig 4). Akbar et al also discloses the pumps **118** and **120** can obtain a pressure of approximately 10-50 mTorr, the pumps **108** and **110** can obtain a pressure of approximately 10^{-7} Torr and the pumps **160,162** and **164** can obtain a pressure of about 200-300 mTorr (col 6, ln 10-40). Akbar et al also teaches a load lock chamber **106**.

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Akbar does not disclose the intended use of the first, second and third pumping systems. However, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). The apparatus taught by Akbar et al structurally reads on the instantly claimed invention, therefore would be capable of performing the intended use.

Referring to claims 2-3 and 8, Akbar et al does not disclose the intended use of the first and second pumping systems. However, the apparatus taught by Akbar et al is capable of performing the claimed intended use of a LPVCD system because the pumps 118 and 120 can obtain a pressure of approximately 10-50 mTorr and an UHV-CVD system because the pumps 108 and 110 can obtain a pressure of approximately 10^{-7} Torr.

Referring to claim 4, Akbar et al discloses a load lock chamber 106 coupled to a turbo pump, this reads on applicant's turbomolecular pump, and a rotary pump, this reads on applicant's mechanical pump. A rotary pump is a well known in the art to be a mechanical pump, note Meyerson (US 5,298,452) below.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 5 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akbar et al (US 5,259,918) as applied to claims 1-4 and 8 above, and further in view of Zhou et al (US 5,879,467).

Akbar et al discloses all of the limitations of claim 5, as discussed previously. Akbar et al does not teach the third pumping system comprises a cryopump and a scroll pump arranged in series.

In a vacuum system for chemical vapor deposition (col 4, ln 25-40), Zhou et al teaches a vacuum chamber 14 is connected to a vacuum pump 18 and the vacuum pump is composed of a cryopump 20 and a rough pump 22 (col 5, ln 1-67 and Fig 3). Zhou et al also teaches the rough pump 22 may be a scroll pump or a dry pump (col 7, ln 45-55). Zhou et al also teaches the chamber 14 can be pumped down to 3×10^{-6} Torr (col 5, ln 30-31).

The vacuum pump taught by Zhou obtains equivalent pressures as the combination of pumps taught by Akbar et al. Also, it is well known in the art that different combinations of vacuum pumps can be used to obtain a high vacuum, note Venkatraman et al (US 6,083,313) below. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Akbar et al with Zhou et al's vacuum pump composed of a cryopump and a scroll pump because substitution of known equivalents for the same purpose is held to be obvious. (MPEP 2144.06)

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9. Claims 6, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akbar et al (US 5,259,918) as applied to claims 1-4 and 8 above, and further in view of Chu et al (US 6,013,134).

Akbar et al discloses all of the limitations of claim 6, as discussed previously. Akbar et al does not teach the first pumping system is coupled to a roots blower and a mechanical pump in series and the second pumping system is coupled to a turbomolecular pump, a roots blower, and a mechanical pump in series.

In an apparatus for chemical vapor deposition, note entire reference, Chu et al teaches an UHV-CVD system includes a turbomolecular pump 24, a roots blower 25, and a mechanical pump 26 in series. Chu et al also teaches a UHV-LPCVD system 14 includes a gas inlet 32, a furnace 33, a turbomolecular pump 34 followed by a mechanical pump 36, and a roots blower 35 followed by a mechanical pump 31. Chu et al also teaches a transfer system 16 includes a turbomolecular pump 40 followed by a mechanical pump 41, and a cryogenic pump 42 followed by a mechanical pump 43.

The combination of vacuum pumps taught by Chu et al obtain equivalent pressures, Low pressure and UHV, as the combination of pumps taught by Akbar et al. Also, it is well known in the art that different combinations of vacuum pumps can be used to obtain a high vacuum, note Venkatraman et al (US 6,083,313) below. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Akbar et al vacuum pumps with Chu et al's combination of vacuum pumps composed of a turbomolecular pump, a mechanical pump and roots blower in series and roots blower and mechanical pump in series because substitution of known equivalents for the same purpose is held to be obvious. (MPEP 2144.06)

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10. Claims 7 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akbar et al (US 5,259,918) in view of Chu et al (US 6,013,134) as applied to claims 6, 9 and 10 above, and further in view of Zhou et al (US 5,879,467).

The combination of Akbar et al and Chu et al discloses all of the limitations of claim 7, as discussed previously. The combination of Akbar et al and Chu et al does not teach the third pumping system comprises a cryopump and a scroll pump arranged in series.

In a vacuum system for chemical vapor deposition (col 4, ln 25-40), Zhou et al teaches a vacuum chamber 14 is connected to a vacuum pump 18 and the vacuum pump is composed of a cryopump 20 and a rough pump 22 (col 5, ln 1-67 and Fig 3). Zhou et al also teaches the rough pump 22 may be a scroll pump or a dry pump (col 7, ln 45-55). Zhou et al also teaches the chamber 14 can be pumped down to 3×10^{-6} Torr (col 5, ln 30-31).

The vacuum pump taught by Zhou obtains equivalent pressures as the combination of pumps taught by Akbar et al. Also, it is well known in the art that different combinations of vacuum pumps can be used to obtain a high vacuum, note Venkatraman et al (US 6,083,313) below. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify combination of Akbar et al and Chu et al with Zhou et al's vacuum pump composed of a cryopump and a scroll pump because substitution of known equivalents for the same purpose is held to be obvious. (MPEP 2144.06).

Conclusion

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11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Meyerson (US 5,298,452) teaches a rotary pump and roots blower are high speed mechanical pumps known in the art (col 6, ln 55-60) and a valve is opened to pump down a furnace tube to vacuum (col 7, ln 1-15).

Venkatraman et al (US 6,083,313) teaches a high vacuum is achieved by roughing down a chamber with a mechanical pump followed by pumping with a roots blower pump and other pumping systems with or with traps can also be used (col 4, ln 60-67).

Barnett et al (US 5,783,295) teaches a chamber is evacuable to a high vacuum level of 1×10^{-6} Torr by using a turbomolecular pump backed by a roots blower and mechanical pump combination (col 5, ln 35-55).

Markunas et al (US 5,180,435) teaches an turbomolecular pump and roots blower together with a mechanical pump obtain pressures of 5×10^{-10} Torr when process gases are not flowing and 1-300 mTorr during epitaxial growth (col 6, ln 45-60).

Collins et al (US 5,210,466) teaches a system may comprise a turbomolecular pump backed by a mechanical pump and an optional roots blower and the turbomolecular pump may be omitted for many high pressure only systems (col 4, ln 45-65).

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J Song whose telephone number is 703-305-4953. The examiner can normally be reached on M-F 9:00-5:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin L Utech can be reached on 703-308-3868. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Matthew J Song
Examiner
Art Unit 1765

MJS
June 30, 2003



ROBERT KUNEMUND
PRIMARY EXAMINER